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ABSTRACT

This report describes a series of ten research experiments over a four-year period on the Teams-Games-Tournament (TGT) instructional process. Chapter I explores reward and task structures used in traditional classrooms, examining their benefits and liabilities, and concludes by proposing alternatives that might provide students with more motivating and satisfying classroom experiences. Chapter II explains that TGT was created with the objective of increasing academic achievement for all children, especially those who have difficulty under traditional task and reward systems. The components of TGT are: teams, games, tournaments, bumping (changing teams), team practice, and weekly newsletters prepared by the teacher announcing team standings and recognizing high scoring individuals. Chapter III summarizes each of the ten TGT classroom experiments to date of this publication. The chapter begins with an overview of and rationale for the TGT research, describing the general research strategy employed. Then, each of the ten studies are reviewed chronologically citing the specific research question addressed, the methodology used, the results, and their implications. Chapter IV summarizes the results and is structured by two major questions: (1) What are the effects of the various TGT structural components on students?; and (2) What are the effects of TGT on students when compared with those obtained using traditional reward and task classroom structures? Chapter V suggests implications of TGT for educators. The evidence collected in the course of the ten research studies suggests that if mass acceptance of TGT occurs, education at many levels and in many subject areas may become more effective in increasing the academic achievement, social growth, and mental health of children. Samples of games and score sheets, and a newsletter, are appended. (MM)

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Center for Social Organization of Schools

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TEAMS GAMES TOURNAMENT: A FINAL REPORT ON THE RESEARCH

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TEAMS-GAMES-TOURNAMENT:

A FINAL REPORT ON THE RESEARCH

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REPORT NO. 217

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Introductory Statement

The Center for Social Organization of Schools has two primary objectives: to develop a scientific knowledge of how schools affect their students, and to use this knowledge to develop better school practices and organization.

The Center works through three programs to achieve its objectives. The Schools and Maturity program is studying the effects of school, family, and peer group experiences on the development of attitudes consistent with psychosocial maturity. The objectives are to formulate, assess, and research important educational goals other than traditional academic achievement. The program has developed the Psychosocial Maturity (PSM) Inventory for the assessment of adolescent social, individual, and interpersonal adequacy. The School Organization program is currently concerned with authority-control structures, task structures, reward systems, and peer group processes in schools. It has produced a large-scale study of the effects of open schools, has developed the Teams-Games-Tournament (TGT) instructional process for teaching various subjects in elementary and secondary schools, and has produced a computerized system for school-wide attendance monitoring. The School Process and Career Development program is studying transitions from high school to post secondary institutions and the role of schooling in the development of career plans and the actualization of labor market outcomes.

This report, prepared by the School Organization Program, describes four years of research conducted on the Teams-Games-Tournament instructional process. The report reviews a series of ten research experiments documenting the effects of TGT on student academic achievement, student attitudes, and peer group process.

Abstract

This report describes a series of ten research experiments over a four-year period on the Teams-Games-Tournament (TGT) instructional process. The research has documented positive effects of TGT on student achievement, student attitudes, and peer group process for students in various subjects in elementary and secondary classrooms. The research and development of TGT has produced curriculum units in language arts (grades 4-6 and 7-9), reading (grades 4-6), and mathematics (grades 3-5) that have been approved by the OE-NIE Joint Dissemination Review Panel and that are being commercially published for classroom use.

ACKNOWLEDGMENTS

This article reviews the labors of many individuals who worked on TGT from the fall of 1971 to the summer of 1975. If TGT works, it is precisely because so many talented individuals contributed to its inception and development.

James Coleman, now at the University of Chicago, and Layman Allen, at the University of Michigan, laid the foundation of the TGT research by their earlier work in innovative classroom structures.

Several Center for Social Organization of Schools staff members played major roles in the TGT research. Keith Edwards, now at Rosemead Graduate School of Psychology, contributed substantially to the design and conduct of four TGT experiments. Gail Fennessey directed the effort to translate TGT into a usable classroom technique with the writing of a technical manual. James McPartland, now Co-Director of the Hopkins Center, provided important guidance and administrative support throughout all four years. John Hollifield not only provided important editorial support, but more importantly shared with the authors a vision of what TGT would become, namely an important technique for teachers across the country.

Educators across the country played a critical role in the development of TGT. To name only a few: Ida Mescon, DeWitt, New York; Philip R. Lucasse, Grand Rapids, Michigan; Richard Lewis, Frederick, Maryland; and Elizabeth Wells, Melbourne, Florida.

All of these individuals worked hard and long to make TGT experiments a reality.

Burma Hulten, Susan Shackman, and John Snyder all served important roles by assisting in various TGT experiments in the analysis of data as well as conducting of experiments.

What follows in this report is an exceptional story. Exceptional because it describes an educational product which (1) was generated from basic social psychological principles, (2) is thoroughly documented by a programmatic set of experiments, and (3) works. Technical reports are not particularly useful media for communicating excitement. Yet we hope our excitement about TGT slips through and that you sense the uniqueness of the story told.

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Chapter I

CLASSROOM REWARD AND TASK STRUCTURES: AN OVERVIEW

In a recent Peanuts cartoon, Peppermint Patty asks her teacher a question which, as she says "...has bothered every kid who has ever gone to school. Why do you never call on me when I know the answer, but always when I don't?" What Peppermint Patty finds vexing about her classroom is not the particular curriculum or academic material which she is required to learn, but the way her level of knowledge is tested. She is dealing with issues of classroom task and reward structures. In particular, Peppermint Patty is complaining that the reward structure of the classroom is insensitive to her efforts--she fails to be rewarded when she knows the answer. We should not be surprised when she stops doing the work required to know the answers. This chapter explores reward and task structures used in traditional classrooms, examining their benefits and liabilities. It concludes by proposing alternatives which might provide the Peppermint Patties of the classrooms with a more motivating and satisfying experience.

A classroom may be seen as being composed of two essential elements; a task structure and a reward structure. The task structure of a classroom refers to the instructional activities formed by the teacher. In most elementary and secondary classrooms, a variety of task structures may be used by the same teacher. Most school tasks involve students working alone (for example, completing worksheets

or reading silently) or listening to or interacting with the teacher. A much smaller number of tasks involve students working or interacting with each other.

The reward structure of the classroom refers to the means that teachers use to motivate students to perform school tasks. Some tasks are intrinsically interesting to students, but even in the most free of free schools the teacher must recognize and reward appropriate student behavior if such behavior is to occur. In most classrooms, the major rewards used are teacher praise and grades. Teachers typically administer these rewards using multiple criteria. Most grades are based on (1) the comparison of a student's performance to that of his or her classmates; (2) a comparison of that student's performance with the teacher's idea of what the student should have accomplished (that is, "effort"); and (3) such factors as attitude, neatness, classroom behavior, and the like. Informal teacher praise is administered according to the same general criteria.

One important commonality in these criteria is that they are all examples of competitive or individual reward structures. That is, these criteria are determined either comparatively, where students are in competition for a limited amount of praise or a limited number of satisfactory grades, or they are determined on some scale that is either absolute or relative to the student's own performance. The reward structure of the majority of classrooms is primarily a competitive one, in which students compete for a necessarily limited number of acceptable grades.

The Traditional Classroom

The traditional classroom may thus be characterized as consisting of an independent or individualistic task structure, and a competitive reward structure. This particular task and reward structure has many virtues. It tends to be easily administered; it is "fair," in that an individual's rewards depend almost entirely on his or her performance (however defined); and it is easily understood by children, parents, and school personnel. However, this traditional task and reward structure has several faults, such as the following:

- Traditional reward structures are not salient for all students. Because of the competitive nature of traditional rewards, many low performing students have little, if any, chance to make acceptable grades regardless of their effort.
- Traditional reward structures "set students against one another," and in turn set many students against academic performance. Because the academic success of one student entails a decrease in the chance that another student will be able to make an acceptable grade, a competitive reward structure disrupts interpersonal bonds among students. Students combat this tendency by discouraging academic performance on the part of their peers, in the same way that employees in industry express their disapproval of co-workers who work "too hard," thereby making other workers look bad. This sets up a situation in which anti-academic peer norms oppose institutional norms, and many students who could achieve at a high level turn their attention

to more peer-supported activities such as sports (see Coleman, 1959).

- Traditional task structures provide few opportunities for active learning. For example, in a class discussion involving thirty students, each student gets an average of only about 1/30th of the time set aside for student responses. In practice this time is unevenly distributed, with bright, articulate students--those who need the least help--taking most of the time. For most students, considerable class time is spend in either passive listening or in individual desk work for which feedback may be far removed in time from performance.

Alternative Classroom Modes

An alternative to the individual task is the group task; alternatives to competitive reward structures are individual reward structures and cooperative reward structures.

A group task is one in which students are permitted or encouraged to aid each other in their learning activities. Peer tutoring is one widely used example of a group task, as are various group projects and discussion groups.

There are three possible categories of reward structures: competitive, individual, and cooperative. In a competitive reward structure there are a limited number of rewards for which students must compete as individuals. Grading on the curve is an example of a competitive reward structure. In an individual reward structure objective standards of performance are set which make the rewards that an

individual receives completely independent of the rewards that others receive. Competitive and individual reward structures are the principal reward systems used in the traditional classroom.

In a cooperative reward structure, rewards are given to groups of students based on the performance of the entire group. Cooperative reward structures may be further divided into group contingencies, in which an objective standard is set for the group to achieve, and group competition, in which groups compete with each other for a limited supply of rewards. Cooperative reward structures, whether they are group contingencies or group competition, have several advantages over individual competition. First, they should motivate all students equally well [Slavin, in press (a)]. An extra point contributed to a team score is just as useful coming from a low achiever as coming from a high achiever. Second, they reverse the process inherent in competitive reward structures in which students are "set against" each other and come to oppose academic efforts on the part of their peers. In a cooperative reward structure, the effective performance of a student improves the chances that others will be rewarded. As a result, academically effective students gain in sociometric status in a cooperative reward structure, but lose status in either a competitive reward structure (Slavin, DeVries, and Hulten, 1975) or an individual structure (Slavin, 1975a). Further, cooperative reward structures motivate students to help each other with their academic work (Wodarski, Hamblin, Buckholdt, and Ferritor, 1973; Buckholdt and Wodarski, 1974; DeVries and Edwards, 1973; Edwards and DeVries, 1974; Slavin, 1975a).

In addition to effects on achievement-related dimensions, cooperative reward structures have had strong and consistent positive impacts on the social connectedness of students, such as liking and mutual concern [see Johnson and Johnson, 1974 or Slavin, in press (b) for reviews]. For many of the social scientists who have worked on cooperative reward structures, this has been the most important outcome. Some have developed strong ideological commitments to the use of cooperative reward structures in classrooms regardless of their effects on academic performance. The reason for this is not hard to understand. Cooperative structuring of classrooms could be expected to have long-term, positive effects on the social connectedness, self-esteem, and possibly general mental health of children. These outcomes have been frequently observed in short-term uses of such structures. However, unless the objectives of schooling are radically redefined, academic performance must be a first priority.

Fostering Learning in Cooperative Groups

Cooperative reward structures must be carefully structured if they are to have positive effects on academic performance. First, they must be designed so that no individuals can "drag their feet" and let the rest of the group do the work. That is, each group member must be individually accountable to the group for his or her behavior. Second, the group task must be one in which the participation of all group members is necessary. A frequently used group reward and task structure that does not meet this criterion is the "group report," in which several students are expected to write one paper. Unless the work is carefully divided, this becomes an essentially individual task,

often conducted by the most diligent and academically skilled group member. Third, the group must be rewarded at the group level for a group performance. If students are asked to work together but are evaluated and rewarded only as individuals, there is no group reward structure, and most of the outcomes associated with group reward structures will not occur. Fourth, the group must be rewarded as a group frequently.

These four conditions are bare essentials if a cooperative reward structure is to have positive effects on academic performance. Even if they are met, such outcomes are not guaranteed. Such factors as task structure, team size, magnitude of reward, method of assigning students to teams, etc. are certainly involved. Social science research has only scratched the surface in understanding the dynamics and requirements of cooperative learning groups, but it has nonetheless shown such positive characteristics of learning teams that these interventions cannot be ignored (Johnson and Johnson, 1974).

One important fact frequently forgotten in research on learning groups is that the desirable outcome of schooling is not a product produced by the students themselves. Many studies have investigated "group productivity" (such as number of ideas produced by the group) instead of individual learning, and team learning procedures have been devised to maximize group productivity rather than individual learning. A laboratory group may produce a good report, but has every participant (including those who may have done little to help prepare the report) really learned anything about science? It is that learning, not the quality of the report, that is the important outcome of the

task. While group productivity may be increased by means of a variety of informal methods, individual learning is hard work. Students do not automatically possess the level of cooperative skills required to do this work. Cooperative reward structures used in classrooms must be designed so that students are motivated to teach each other and to learn themselves, to do the hard and often painful work of mastering academic material.

The task for social science is clear. It is known that cooperative reward structures have positive effects on students' social connectedness, attitudes, and possibly mental health, and that they can have positive effects on academic performance under certain conditions. The job is to find those conditions and to create practical interventions to permit the implementation of cooperative reward structures in classrooms.

Teams-Games-Tournament (TGT) is an instructional method which uses what is known about small groups and academic motivation. TGT is capable of producing positive outcomes on social, attitudinal, and academic performance dimensions. It is both a practical program designed for use in typical classrooms without great expenditure or effort, and a useful research tool with which group processes, peer norms, student attitudes, and academic motivation may be studied by means of experimental manipulations in natural classroom settings. What follows is a description of the TGT structure and review of the classroom research on TGT.

CHAPTER II

TGT: A DESCRIPTION

Following the above discussion, it is clear that if a cooperative reward/group task system could be constructed so as to increase student academic performance, other important outcomes (such as increased social connectedness, pro-academic peer norms, and greater satisfaction with school) could also be anticipated. However, it is also apparent that simply setting up a cooperative reward structure with group tasks will not guarantee positive effects on academic performance. TGT was created with the objective of increasing academic achievement for all children, particularly children who have difficulty under traditional reward and task systems. It was designed with several features critical to the use of a cooperative reward structure and a group task in increasing academic performance.

TGT Features

1. Small teams. Research on group size has indicated that small, face-to-face teams are more efficient and cohesive than larger teams (Lott and Lott, 1965).

2. Heterogeneous teams. As a major purpose of the teams is to provide an opportunity for peer tutoring, each team must have a mix of students.

3. Performance at the individual level. Most school tasks do not lend themselves naturally to true cooperation or division of labor, particularly as the outcome of education is

not a group product but is knowledge instilled in each student. If learning is to occur in a team reward structure, each student must be individually responsible for his or her performance, and that performance must be evaluated in a setting in which help from teammates is not permitted. Otherwise, responsibility for the group performance will be left with the most able group members, while the less able members are ignored.

4. Team incentives must be sufficient to motivate team performance and delivered frequently. If teams are to work effectively, they must be motivated to do so. The amount of incentive needed to motivate team performance varies from situation to situation. However, one useful incentive is to have teams engage in team competition, and then to recognize successful teams. This approach avoids the use of (1) grades, which cannot be given at the team level, and (2) material rewards, which are expensive as well as disliked by many teachers and parents.

Teams must be rewarded frequently for two reasons. First, frequent rewards are known to be more powerful than infrequent ones in motivating behavior. Second, because students are ultimately evaluated at the individual level instead of the team level, team rewards must be separated from individual evaluations. This can be best accomplished by giving team rewards frequently, while giving individual evaluations less frequently.

5. The contributions of team members must be equally valuable. If some students' contributions to the group product are more valued than others' contributions, the less valued students may fail to contribute up to their full potential.

TGT Components

TGT, or Teams-Games-Tournament, was designed to be easy for teachers to use, involving minimal expense and only minor additional preparation. A TGT teacher's manual lays out the TGT activities in a step-by-step fashion.* The principle components of TGT are as follows:

Teams. Students are assigned by the teacher to 4-5 member teams. Each team reflects a cross section of the academic ability, race, and sex composition of the class. The teacher ranks the students from top to bottom on past academic performance in the skill area to be taught, and then forms teams which contain a high achiever, a low achiever, and two to three average achievers. The teams are balanced on race and sex composition. Team membership remains constant over the course of the TGT instructional period (six to ten weeks). Teammates are usually assigned adjacent seats for that period of time.

Games. Students compete against members of other teams on

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* Copies of the TGT manual, sample games, and complete game sets may be obtained from the publisher. Write to - Argus Communications; 7440 Natchez Avenue; Niles, Illinois 60648

simple, course content-relevant academic games. These games typically consist of short-answer questions covering material taught in class. Several TGT game sets are being published, and teachers can make their own. The games are played according to a standard set of rules called the General Instructional Game Structure, or GIGS. The GIGS rules are reproduced in Appendix A, and a sample TGT game is presented in Appendix B.

Tournaments. Students play the games in frequently held tournaments. Each tournament takes approximately 40 minutes. They may be held either once or twice per week, depending on the curriculum and the teacher's preferences. In the tournaments, students compete as individuals to contribute points to their teams. They play at three-person, ability-homogeneous "tournament tables." At the conclusion of play at each table the high scorer brings six points each to his or her team; the middle scorer brings four points; and the low scorer brings two points. This scoring system means that each student, regardless of prior performance level, has a roughly equal chance (one chance in three) of bringing six points to his or her team. Students are assigned to their initial tournament tables based on their achievement rank--the top three students compete at Table #1, the next three at Table #2, and so on. However, table assignment changes from tournament to tournament.

Bumping. "Bumping" is a procedure used in TGT to assign students to tournament tables after the first tournament. Its purpose is to change competitors to keep interest high and to maintain equal competition at each tournament table. After each tournament, the teacher assigns

the high scorer at each tournament table to the next higher table (with higher performing students), the low scorer to the next lower table, and the middle scorer to the same table he or she competed at before. That is, the winner at Table 4 is "bumped" to Table 3 for the next tournament, the low scorer is "bumped" to Table 5, and the middle scorer remains at Table 4.

Team Practice. On the day before each tournament, each team is given an opportunity to learn the material to be used in the games. Team members may study together or fill out worksheets, which may either contain the exact game items or a larger set of items from which the game items will be selected. Peer tutoring is encouraged but not required during the team practice sessions.

Newsletters. At the end of each week during which TGT is used, the teacher prepares a dittoed class newsletter and distributes it to the class. The newsletter announces team standings and recognizes individuals who have contributed six points (the maximum) to their team scores. The newsletter can be taken home by students, and is usually posted around the class to provide maximum recognition for the teams and students who have done well. A sample newsletter is presented in Appendix C.

In using TGT in the classroom, teachers typically follow one of two weekly schedules presented in the TGT manual. One schedule involves three periods of traditional teaching, followed by one period of team practice and one period of tournament (usually held on a Friday). An alternative schedule involves a more intensive use of TGT, with two tournaments and two team practice sessions per week.

CHAPTER III

A REVIEW OF TGT RESEARCH IN THE CLASSROOM

This chapter summarizes each of the ten TGT classroom experiments conducted to date. The chapter begins with an overview and rationale of the TGT research, describing the general research strategy employed. The second section reviews, chronologically, each of the ten studies, citing the research questions addressed, research methodology used, the results, and their implications.

OVERVIEW AND RATIONALE OF TGT RESEARCH

A series of ten TGT field experiments have been conducted under the auspices of the School Organization Program of the Center for Social Organization of Schools. Each study has addressed one of the following two questions:

(1) Does TGT, when contrasted with reward and task structures traditionally used in the classroom, result in differential effects on a variety of student outcome and process variables (e.g., student academic performance, attitudes, peer tutoring)? This question appeared particularly important to address, especially in the initial phases of the research program. It was entirely possible that although TGT represented a major restructuring of classroom management, it would have few systematic effects on students. For example, research in academic simulation games (cf. Coleman, et al. 1973), many of which involve complete transformations in classroom reward and task structures, has not shown a large magnitude of effects, particularly on student academic performance.

(2) Which components of the TGT structure affected which dependent variables? For example, one of the initial studies contrasted the effect of the reward interdependence created by TGT (by comparing team competition with individual competition) with the effect of the social nature of the TGT task (by comparing game tasks with individual quiz tasks). By splitting TGT into its various components, the research permitted assessment of both (1) what components would be required to have a positive TGT impact, and (2) why TGT, as a systemic intervention, was or was not having an effect on the dependent variables. Addressing this latter issue was important to provide the beginning of a theory of TGT and its effects on students.

Research Methodology

The ten TGT studies shared one common methodological bias. All were conducted in ongoing classrooms by teachers assigned to those classrooms. They can be classified as field experiments because, although they were conducted in classroom settings, they also employed some basic experimental controls. That is, teacher effect was at least partially if not totally controlled. Random assignment was also used, if not at the individual student level, at least at the classroom or teacher level. All experiments incorporated, at a minimum, an experimental-group and control-group comparison.

The field experiment methodology used in the TGT research has both advantages and disadvantages. Perhaps the most important advantage is the ease in generalization of the observed effects to actual

elementary and secondary school classrooms. A real disadvantage of the methodology lies in the theoretically crude distinctions among variations in reward and task structures required for implementation in the classroom.

Insert Figure 1 About Here

Figure 1 contains a useful summary of the methodological characteristics of the ten TGT studies. The Figure describes each study on three basic dimensions: the general experimental setting, the experimental design and comparisons, and dependent variables measured. The rows in the Figure correspond to the ten studies described below. As the Figure indicates, four subject areas have been used, with particular emphasis on mathematics and language arts. Students from grades 3 through 12 have served as subjects, with the majority of the studies using junior high school students. The studies have ranged in length from 4 to 12 weeks, and the number of teachers involved ranged from 1 to 24. The first four experiments were conducted in east coast urban school settings, whereas the latter six used subjects from suburban settings.

Examining experimental design characteristics, Figure 1 indicates that six of the studies randomly assigned students to treatment condition at the individual student level, three randomly assigned at the classroom level, and one assigned at the teacher level. All ten experiments contained TGT vs. control group comparisons, and five of the ten also compared one or more TGT variations.

FIGURE 1

SUMMARY OF TGT RESEARCH DESIGNS

	EXPERIMENTAL SETTING						DESIGN			DEPENDENT VARIABLES MEASURED		
EXPERIMENT NUMBER	SUBJECT AREA	GRADE LEVEL	LENGTH STUDY (WEEKS)	NUMBER STUDENTS	NUMBER TEACHERS	GEOGRAPHIC LOCATION	RANDOM ASSIGNMENT	TGT VS. CONTROL	TGT VARIATIONS	ACADEMIC ACHIEVEMENT	STUDENT ATTITUDES	PEER GROUP PROCESS
(1)	MATH	7	9	96	1	URBAN-EAST	CLASS	X		X		
(2)	MATH	7	4	110	4	URBAN-EAST	STUDENT	X	X	X	X	X
(3)	MATH	7	12	128	1	URBAN EAST	STUDENT	X	X	X	X	X
	SOCIAL STUDIES	7	12	128	1	URBAN EAST	STUDENT	X	X	X		X
(4)	MATH	7	10	299	2	URBAN EAST	CLASS	X	X	X	X	X
(5)	SOCIAL STUDIES	10-12	12	191	2	SUBURBAN SOUTH	CLASS	X	X	X	X	X
(6)	LANGUAGE ARTS	3	6	60	2	SUBURBAN EAST	STUDENT	X		X	X	X
(7)	LANGUAGE ARTS	3	6	53	2	SUBURBAN EAST	STUDENT	X		X	X	X
(8)	READING	3	5	53	2	SUBURBAN EAST	STUDENT	X		X		
(9)	LANGUAGE ARTS	7-8	10	1742	24	SUBURBAN MIDWEST	TEACHER	X		X	X	X
(10)	SOCIAL STUDIES	7-9	10	57	4	SUBURBAN EAST	STUDENT	X		X	X	X

The final category reviewed in Figure 1 involves the dependent variables measured. Eight of the ten measured all three types of dependent variables (student academic achievement, student attitudes, and peer group process). The remaining two focused only on student academic achievement.

The design of the ten studies provide a powerful tool for answering the important question of whether TGT will have a more positive impact on students than traditional approaches. The set of ten studies allows a cross-validation of TGT effects across (1) different student populations (urban-suburban, elementary-secondary), (2) different teachers, (3) different subject areas, and (4) various lengths of time. A consistent pattern in the results across all these dimensions would suggest a powerful classroom intervention, and one which can be applied widely.

TGT RESEARCH - A REVIEW

This section describes each of the ten TGT studies. Every description covers the following issues: (1) background information (publications emanating from the study), (2) research questions addressed by the study, (3) research methodology employed, and (4) a summary and discussion of the results obtained. The next chapter (IV) integrates the results of the ten studies.

STUDY NUMBER 1

BACKGROUND INFORMATION:

Edwards, K. J., DeVries, D. L., & Snyder, J. P. "Games and teams: a winning combination." Center for Social Organization of Schools, The Johns Hopkins University, Baltimore, Maryland, Report No. 135, 1972.

Edwards, K. J., DeVries, D. L., & Snyder, J. P. "Games and teams: a winning combination." Simulation and Games, 1972, 3, 247-269.

RESEARCH QUESTIONS:

The study tested two hypotheses. Hypothesis 1: A unique combination (TGT) of team competition and a nonsimulation game will have a positive effect on achievement in mathematics (when compared with a traditional classroom structure). It was predicted that (a) the team competition would facilitate achievement by encouraging peer tutoring among teammates, (b) the nonsimulation game used (Equations) would increase academic achievement because mathematics skills are required to succeed at the game (thereby becoming functional for the students), and (c) the unique "bumping" procedure would motivate students to achieve by allowing for a consistent and reasonably high probability of success (probability of .33). Hypothesis 2: A trait-by-treatment interaction effect will occur. Namely, the team competition-gaming combination would have greater effect on the academic achievement of low-ability students than on average-ability students.

METHOD

Ninety-six (96) seventh grade students, representing four mathematics classes (two comprised of low-ability students and two containing average-ability students) were involved in a nine-week experiment. The study was a 2 x 2 x 2 repeated measures ANOVA design, with the three factors being (a) treatment (TGT vs. traditional), (b) classroom math ability (low vs. average), and (c) time (pretest and posttest). All classes were taught by the same teacher, and were randomly assigned to treatment (blocking on class ability). The experimental treatment group was exposed to a standard TGT treatment (four-member teams, twice-weekly tournaments designed around the nonsimulation game Equations). The control group students were exposed to the same curriculum materials as were the experimental students, but performed on frequently assigned worksheets and received feedback only on their individual performance. Three measures of mathematics skills were administered: (1) Computations Subtest of the Stanford Achievement Test (SAT) in Mathematics, (2) A subset of items of the SAT representing skills directly taught during the experiment, and (3) A Divergent Solutions test measuring the student's skills at deriving as many algebraic equations as possible in response to a given mathematical "goal."

RESULTS AND DISCUSSION

Significant ($p < .05$) and positive TGT effects were observed for all three measures of mathematics achievement. A significant trait-treatment interaction was noted for the Divergent Solutions test only.

More specifically, students in the low-ability TGT class responded more positively to TGT (i.e., showed greater growth in achievement) than did the average ability class. In short, the results supported the first hypothesis (that of an overall TGT effect on achievement), but only partially supported the second hypothesis (that low-ability students would respond most positively to TGT).

STUDY NUMBER 2

BACKGROUND INFORMATION

DeVries, D. L. & Edwards, K. J. "Student teams and instructional games: Their effects on cross-race and cross-sex interaction." Center for Social Organization of Schools, The Johns Hopkins University, Baltimore, Maryland. Report No. 137, 1972.

DeVries, D. L. & Edwards, K. J. "Learning games and student teams: Their effects on classroom processes." Center for Social Organization of Schools, The Johns Hopkins University, Baltimore, Maryland. Report No. 142, 1972.

Edwards, K. J. & DeVries, D. L. "Learning games and student teams: Their effects on student attitudes and achievement." Center for Social Organization of Schools, The Johns Hopkins University, Baltimore, Maryland. Report No. 147, 1972.

DeVries, D. L. & Edwards, K. J. The effects of games and teams in the classroom. Proceedings of the 11th Annual National Gaming Council, Baltimore, Maryland. The Johns Hopkins University, 1972.

DeVries, D. L. & Edwards, K. J. Learning games and student teams: Their effects on classroom processes. American Educational Research Journal, 1973, 10, 307-318.

DeVries, D. L. & Edwards, K. J. Student teams: Integrating desegregated classrooms. Proceedings 81st Annual Convention American Psychological Association, 1973, 654-664.

DeVries, D. L. & Edwards, K. J. Student teams and learning games: Their effects on cross-race and cross-sex interaction. Journal of Educational Psychology, 1974, 66, 741-749.

RESEARCH QUESTIONS

The first study indicated an overall positive TGT effect on student academic achievement. The second study assessed which of the TGT components accounted for the abovementioned effects. Two dimensions of TGT, the team competition and academic games (played in the tournament context) were explored. The team component was important because assigning students to teams creates (1) more opportunities for student peer tutoring, and (2) a peer normative climate which reinforce academic achievement. The learning game-tournament component (defined by the playing by students of a game at a three-person table, facing opponents of comparable ability), facilitates the learning process because it creates a highly enjoyable interactive task setting, one on which feedback on performance is immediate and frequently positive. Study 2 examined the separate as well as combined effects of the student team and learning game components of TGT on academic achievement, student attitudes and classroom process.

METHOD

One hundred seventeen (117) seventh-grade students were involved in a four-week experiment with 2 x 2 x 3 randomized block design. The three factors were (a) Reward (team vs. individual), (b) Task (game vs. drill), and (c) Achievement (low, middle, and high). The four treatment groups were taught by four teachers, who were rotated across treatments at the midpoint of the study. Two reward structures were used: one rewarded four-member student teams (as in TGT), and the other rewarded individuals. The two task structures implemented were

(1) a mathematics learning game using the tournament structure outlined in Chapter II, and (2) drill or quiz exercises completed at the individual student level. Posttest measures were administered on the following dependent variables: (1) academic achievement (divergent solutions test and a treatment-specific mathematical computations test), (2) student attitudes (toward mathematics, attending class, and toward specific activities in the class), and (3) classroom social process (perceived mutual concern, cohesion, competition, peer tutoring, and cross-race as well as cross-sex interaction).

RESULTS AND DISCUSSION

As to the first question (focusing on achievement), the games-tournament component had a significantly positive effect on one of the two measures of mathematics achievement (the divergent solutions test). The positive effect was due primarily to middle and high achieving game-tournament students. The team reward structure had no effect on achievement. The results for the four measures of student attitudes indicated positive game-tournament effects on all measures, whereas only one isolated team-reward effect was noted. The results for classroom social process variables reveal a very different pattern. The reward factor significantly affected student peer tutoring, cross-race and cross-sex helping and friendship, and perceived mutual concern and competition (the team reward condition

was higher on all these dimensions). The games-tournament component created greater peer tutoring, and formed a classroom perceived by the students as being less difficult and less competitive. The results suggest the games-tournament component of TGT has a strong effect on achievement and attitudes, whereas the team component particularly facilitates group process, such as peer tutoring and mutual concern. The results suggest that games and teams are complementary structural variations which, when combined, substantially alter the social and affective climate of the classroom.

STUDY NUMBER 3

BACKGROUND INFORMATION

Edwards, K. J. & DeVries, D. L. "The effects of Teams-Games-Tournament and two structural variations on classroom process, student attitudes and student achievement." Center for Social Organization of Schools, The Johns Hopkins University, Baltimore, Maryland. Report No. 172, 1974.

RESEARCH QUESTIONS

This study evaluated the effects of two TGT variations and tested for the generalization of the TGT effects noted in the prior two studies to social studies. The first variation in TGT structure was based on a simple equity theory assumption that the 6-4-2 tournament scoring would be perceived as inequitable, particularly by the high achieving students. Several of the ability-by-treatment interaction effects noted in the first two studies indicated that high achieving

students responded less positively to TGT. The present study asked whether a variation in the tournament scoring procedure (in which a greater number of points were assigned to performance at higher ability game tables) would affect students' responses to TGT. The second variation involved the deletion of the team competition component. Prior small group research suggested that competition across teams has a facilitative effect, particularly on group processes such as cohesion. The study assessed the effect of interteam competition across teams. A final question asked whether TGT works equally well in different subject areas--mathematics and social studies.

METHOD

One hundred twenty-eight (128) seventh-grade students were randomly assigned (blocking on ability, race, and sex) to four treatment conditions as part of a twelve-week experiment. Two of the students' classes, mathematics and social studies, were involved in the present study. All mathematics classes were taught by one teacher, and all social studies classes by another. All dependent variables were measured on a posttest basis only. The four treatment groups were: (1) Control: conventional instructional techniques using frequently assigned quizzes as the performance setting, with rewards administered on an individual basis; (2) TGT: standard TGT procedures (described in Chapter II) were used, with a modified Equations used as the game in mathematics, and Ameri-Card employed in social studies; (3) TGT-Weighted: TGT as typically operationalized, with the following variation in tournament scoring. The scoring for the top three tables (in ability) ranged from 18-12-6, the scoring in the middle four tables ranged from 12-8-4, and the scoring in the bottom three

tables ranged from 6-4-2. (4) TGT-Weighted-No Team Competition: This TGT condition employed the weighted tournament scoring and each team received feedback only on its own score: no interteam comparisons were formed.

Dependent variables measured sampled the following categories: student academic achievement, student attitudes, and group (classroom) process. The majority of the measures were administered in both subject areas. The achievement measures involved two in mathematics (Divergent Solutions Test and a mathematics computations test) and one in social studies (a treatment-specific measure of maps, states, and capitols skills). Three measures of attitudes assessed perceived satisfaction, perceived difficulty, and general attitude toward the class. Measures of group process were four self-report measures--competition, cohesiveness, mutual concern, and normative climate--as well as several sociometric measures.

RESULTS AND DISCUSSION

One question raised by the study concerned the generalization of TGT effects across subject areas. The first two studies conducted used only mathematics classes. The results of the current study revealed no treatment effects for any of the dependent variables in social studies. The lack of any TGT effect (or effect of any of the TGT variations), it was hypothesized, was due in part to the limitations of the learning game used (Ameri-card) which proved relevant to only a small portion of the twelve-week curriculum. In contrast, treatment effects were detected for a wide variety of dependent variables in the mathematics classes.

A positive treatment effect was noted for the Divergent Solutions measure of achievement (with TGT scoring sigher than control and either TGT variation treatment). Of the three attitude measures, a significant (in positive direction) treatment effect was detected for the attidude toward class measure (with TGT and TGT-Weighted scoring highest). The final dependent variable set, group process, revealed marginally significant ($p < .10$) effects on cohesiveness and mutual concern (with TGT students scoring highest), and a significant effect on reported frequence of peer tutoring (with TGT students scoring highest and TGT-Weighted-No Team Competition scoring lowest). Two group cohesiveness measures (taken from sociometric data) reflected significant treatment effects, with TGT conditions scoring higher than control on both measures. In summary, of the three TGT conditions in the mathematics classes, TGT appeared to have a greater impact on the entire range of dependent variables than did TGT- Weighted and TGT-Weighted in turn created a greater impact than did TGT-Weighted-No Team competition. Both TGT variarions appeared to detract from the TGT effect, with the deletion of the team competition being a particularly significant omission.

STUDY NUMBER 4

BACKGROUND INFORMATION

Hulten, Burma H. Restructuring the classroom learning environment: The use of student teams, instructional games, and small group practice sessions to increase the computation skills of low and high achieving seventh grade students. Unpublished dissertation, University of California at Berkeley, 1975.

Hulten, Burma H. & DeVries, D. L. Team competition and group practice: Effects on student achievement and attitudes. Center for Social Organization of Schools, The Johns Hopkins University, Report No. 212.

Slavin, R. E., DeVries, D. I., & Hulten, B. H. Individual vs. team competition: The interpersonal consequences of academic performance. Center for Social Organization of Schools, The Johns Hopkins University, 1975, Report No. 188.

RESEARCH QUESTIONS

The fourth study was designed to answer three general questions. First, what is the overall effect of TGT on academic achievement when contrasted with a traditional classroom structure? This study attempted to replicate the earlier findings of positive TGT effects on mathematics achievement. Secondly, what are the effects of two TGT components--team competition and team practice sessions--on mathematics achievement? Of particular interest was finding out if the effectiveness of the team competition was contingent on the teammates having regular opportunities to interact. If the teams are effective because of consid-

erable within-team peer tutoring, the practice sessions would appear essential. The third question concerned the impact of TGT, and its two components of interest in the present study, on cognitive mediating variables suggested by expectancy-value theory, namely perceived probability of success and perceived importance of success. Finally, Slavin et al. (1975) conducted a secondary analysis of the sociometric data to determine the effect of team vs. individual competition on the correlation beyween game success and gain in sociometric status. This correlation was interpreted as a quasi-behavioral index of peer norms regarding academic achievement.

METHOD

Two hundred ninety-nine (299) seventh-grade students, representing 10 mathematics classes (taught by two teachers) participated in a ten-week field experiment. A 2 x 2 factorial design with an external control group was implemented. The two factors were reward system (individual competition vs. team competition) and practice mode (individual practice versus group practice). Traditional reward and task structures were implemented in the external control group. Classes were randomly assigned to treatments, stratifying on both teacher and student mathematics ability. The reward system factor implemented team competition in the context of TGT. The individual competition treatment involved TGT, except that students played at the tournament tables as individuals. Feedback on their performance (in the form of classroom newsletters) also compared only individuals' performances during the tournament. The practice mode factor allowed students to practice regularly with other students (teammates in the team competition condition) or forced individual practice on the students.

Two sets of dependent variables were measured: achievement and cognitive mediators. The measure of mathematics achievement (administered on a posttest and pretest basis) was the Stanford Achievement Test (Intermediate II)-Arithmetic Computations Subtest. Four cognitive mediating variables were measured by a student questionnaire on a posttest basis only: perceived probability of success, incentive value of success, peer pressure to do well in the class, and satisfaction.

RESULTS AND DISCUSSION

The results indicate a significant positive TGT effect on mathematics achievement (comparing the two team competition cells with the external control group). The answer to the second question (concerned with the separate impact of the two TGT components on achievement) is that only the reward system had a clear main effect. That is, students in the team competition treatment improved more than did students in the individual competition treatment. An ability-by-practice-mode interaction effect was noted. It appeared that the group practice facilitated growth in mathematics skills for the higher ability students, but at the same time had a debilitative effect on the lower ability students. Of interest was the lack of a significant reward-system-by-practice-mode interaction effect, indicating that team competition was as effective without group practice as it was with group practice. The results cast doubt on the importance of informal peer tutoring in the TGT treatment.

The usefulness of expectancy-value constructs in interpreting the effects of TGT was confirmed by the results. In comparing TGT with the control group, the TGT students reported significantly

higher perceived probability of success than did their control group counterparts. An additional interaction effect indicated that the contrast (between TGT and control) was particularly great for lower ability students; the subset of students for whom TGT creates the most difference in classroom structure.

The secondary analysis indicated a significant effect in favor of team competition on the measure of pro-academic peer norms. That is, high performers in the team classes gained friends relative to low performers more than they did in the individual competition classes. Because of the ability-balancing procedure used in all classes, these "high performers" were presumably high effort, not high ability students, and their effort appears to have gained them social standing in the TGT classes.

STUDY NUMBER 5

BACKGROUND INFORMATION

DeVries, David L., Edwards, Keith J. & Wells, E. H. "Teams-Games Tournament in the social studies classroom: Effects on academic achievement, student attitudes, cognitive beliefs and classroom climate." Center for Social Organization of Schools, The Johns Hopkins University, Baltimore, Maryland, Report No. 173, 1974.

DeVries, David L., Edwards, Keith J. & Wells, E. H. "Team competition effects on classroom group process." Center for Social Organization of Schools, The Johns Hopkins University, Baltimore, Maryland, Report No. 174, 1974.

RESEARCH QUESTIONS

This study addressed two major questions. First, what is the effect on group process as well as achievement of a restructuring of team scores in TGT, in which the performance of lower achievers is more heavily weighted? TGT, as noted earlier, involves a team scoring procedure in which all teammates, regardless of ability, can contribute equally to the team score. Such a scoring procedure might have a debilitative effect on within-team tutoring, in which low ability students should receive instruction from their higher ability teammates, as the TGT structure may make it difficult for the team to identify the low ability students. The present study asks whether a revised team scoring procedure, in which the scores of low achieving students are heavily weighted, will result in more peer tutoring and thus an effective treatment. This variation stands in direct contrast to that implemented in study number 3, in which the scores of higher ability students were more heavily weighted. In that study

the weighting procedure had the effect of reducing peer tutoring and mutual concern (when contrasted with TGT, using unweighted scores).

The second question concerns the general effect of TGT, contrasted with a traditional reward and task structure. This particular test of TGT used high school students in social studies classrooms.

METHOD

One hundred ninety-one (191) students representing six social studies classrooms were subjects in a twelve-week field experiment. The students were drawn from the 10th, 11th, and 12th grades. The experiment had a 3 x 2 (treatment by teacher) design. The experiment used intact classes, with classes (within each teacher) randomly assigned to treatments. The three treatment levels were: Individual Competition (traditional control group), TGT-A (TGT using the standard averaging formula for calculating team scores), and TGT-W (TGT using a formula weighting scores earned by low performers. The weighting procedure used in the TGT-W condition involved multiplying each teammate's raw tournament score by the rank of his/her score (contrasting the score with those of all teammates) to form a composite score. The tournament structure varied slightly from that typically used in TGT research. The changes were, in part, required by the complexity of the subject matter studied. A wide variety of dependent variables were measured: achievement in social studies (SCAT-STEP, a standardized measure, and a treatment specific social studies test), student attitudes (apathy, satisfaction, attitude toward American History), and classroom climate. Classroom climate measures involved both classroom cognitive climate (focusing on level of on-task student behavior and level of cognitive activities, as measured by the

Classroom Activities Questionnaire), and classroom social climate (measuring frequency of peer tutoring, perceived mutual concern and competition). Most of the measures were administered on both a midtest and posttest basis.

RESULTS AND DISCUSSION

The first question concerned the effects of the weighted team scores on academic achievement and classroom group processes. The relevant comparison was that of TGT-A with TGT-W on a large variety of academic achievement and classroom process variables (such as frequency of peer tutoring, perceived mutual concern, etc.). An analysis of within-team interaction did reveal a greater tendency of TGT-W teams to peer tutor teammates than did TGT-A teams. This effect was apparently due primarily to greater help assigned to low performing teammates (TGT-W low performers reported being helped by an average of 2.7 teammates, whereas TGT-A low performers cited help from an average of 1.0 teammates). In short, the redesigning of the TGT team scores did affect within-team peer tutoring practices; however, these effects were not translated into increased academic achievement.

The second question concerned the overall effect of TGT (when compared with a traditional control group) on student achievement, attitudes, and classroom climate. The results indicate a marginally significant ($p < .10$) TGT effect on the treatment specific achievement measure (in a positive direction), with no effect noted for the SCAT-STEP measure. Positive TGT effects were found

on all three attitude measures (attitude toward American History, Satisfaction, and Apathy). TGT had significant effects on both cognitive climate (for example, increased percent of student on-task behavior, reduced amount of teacher talk during class period), and social climate (increased mutual concern, frequency of peer tutoring, and other sociometric variables).

The TGT effects must be interpreted in light of frequently significant teacher-by-treatment interaction effects. Many of the abovementioned TGT effects were due primarily to one of the two teachers. In summary, the data suggest the variation of TGT team scoring (in which performance of low-ability students is more heavily weighted) has only isolated effects, whereas the TGT-control group comparison confirms the findings of earlier TGT research, in which major effects occur particularly for student attitudes and classroom climate (both social and cognitive).

STUDY NUMBER 6

BACKGROUND INFORMATION

DeVries, David L. & Mescon, Ida T. "Teams-Games-Tournament: An effective task and reward structure in the elementary grades." Center for Social Organization of Schools, The Johns Hopkins University, Baltimore, Maryland, Report No. 189, 1975.

RESEARCH QUESTIONS

The results of the first five studies suggested that TGT was effective in improving the mathematics achievement of secondary school students. The present study was designed to extend the TGT findings to a new age group (middle elementary grades) and to a new subject area (language arts). The reward and task structures created by TGT place the students in a variety of social settings, some of which "require" competitive behaviors and some of which "require" cooperative behaviors in order to be effective. An important question is whether eight- or nine-year-old students have the requisite social skills to adapt to the various social settings created by TGT. The second question (concerning generalization of TGT effects across subject areas) follows in part from the lack of any clear TGT effects on social studies achievement. It is possible that TGT achievement effects are subject-bound, making the test of TGT in language arts classes an important extension of the evaluation of TGT.

METHOD

Sixty (60) third-grade students, representing two language arts classes, participated in a six-week field experiment. Students were randomly assigned to either of two treatment conditions; (1) TGT, or (2) Control which employed traditional reward and task

structures. Two teachers participated in the study, with teacher effect controlled by frequent rotation of teachers between treatments. The TGT/ treatment used a total of 22 language arts games designed by the participating teachers using the GIGS structure.

The dependent variables measured represented three categories: achievement in language arts, classroom group process, and student perceptions or attitudes. Two measures of achievement were administered as pre and posttests: the Hoyum-Sanders Elementary English Test (a standardized measure), and a treatment-specific achievement test, focusing on the specific language arts skills taught during the experimental period. Classroom group process was measured (via a posttest) by several sociometric questions, and student perceptions were assessed by an eight-item student questionnaire (administered as a posttest).

RESULTS AND DISCUSSION

The analysis of both achievement measures was at the subtest level, with each subtest measuring a specific set of language arts skills. Significant and positive TGT effects were noted for two of the six Hoyum-Sanders subtests, and for all three subtests of the treatment-specific measure. An analysis of the Hoyum-Sanders items indicated the two subtests for which TGT effects were noted consisted of a considerable greater number of items which directly measured skills taught during the six-week unit. Analyses of the sociometric data indicated a positive TGT effect on the number of helping relationships, as well as a substantial reduction in the number of social isolates in the class on task relationships. No such effects were observed for similar measures on the friendship dimension. No TGT effects were noted for any of the student perception

items, in part because the control students perceived their class in a very favorable light. The results suggest that TGT can be productively extended to other subject areas and can affect performance of students in the elementary grades.

STUDY NUMBER 7

BACKGROUND INFORMATION

DeVries, David L., Mescon, Ida T., and Shackman, Susan L. "Teams-Games-Tournament in the elementary classroom: A replication." Center for Social Organization of Schools, The Johns Hopkins University, Baltimore, Maryland, Report No. 190, 1975.

RESEARCH QUESTIONS

This study was designed as a replication of study 6 using identical curriculum materials, but with an independent sample of students.

METHOD

All aspects of the present study were identical to those of study number 6, except for the sample size, which was 54.

RESULTS AND DISCUSSION

The results revealed significant and positive TGT effects on both measures of achievement in language arts. Significant treatment effects were noted for three of the six subtests of the Hoyum-Sanders, as well as the total test score. Significant treatment effects were also detected for all three of the subtests of the treatment-specific measure of

language arts. Treatment effects on classroom group process were identical to those in the original study. That is, positive TGT effects were noted for the helping relationships, but not for the friendship dimension. As in the original study, no TGT effects were noted for the student perception variables. In short, the results of the current study represent an almost complete match of those obtained in study number 6. The combined results indicate TGT has positive impact on achievement and classroom group process in language arts classes in the elementary grades.

STUDY NUMBER 8

BACKGROUND INFORMATION

DeVries, David L., Mescon, Ida T., and Shackman, Susan L. "Teams-Games-Tournament (TGT) effects on reading skills in the elementary grades." Center for Social Organization of Schools, The Johns Hopkins University, Baltimore, Maryland, Report No. 200, 1975.

RESEARCH QUESTIONS

The main question of interest for Study 8 is whether TGT, when compared to a more traditional classroom management structure, results in more effective teaching of two diverse reading skills (reading vocabulary and verbal analogies) for third-grade students. Another question, of secondary interest, is whether TGT facilitates acquisition of reading skills for some students more than others. For example, Study Number 1 found greater TGT effects (in mathematics classes) for low-ability classes than for average-ability classes. The present study tests for a possible trait-by-treatment interaction effect. Additionally, because two very different reading skills were addressed, one involving more complex

cognitive processes than the other, it is important to assess whether TGT is equally effective for both types of skills.

METHOD

Fifty-three (53) third grade students served as subjects in a five-week field experiment using a simple two-group comparison, contrasting TGT with a control treatment. Two teachers were involved in the experiment, with teacher effect partially controlled by rotation of teachers across treatment groups every 5 to 7 school days. The teachers and students were the same as those involved in Study 7. The first three weeks focused on vocabulary skills, while the latter two weeks addressed verbal analogies. TGT took the same form as in studies 6 and 7. Thirteen vocabulary games and nine verbal analogy games (all designed around GIGS) were used during the five-week period.

The control condition involved teaching similar vocabulary and verbal analogy skills, with students working alone (on a variety of gamelike worksheets) and being rewarded on an individual basis. Academic achievement was the dependent variable of interest, with two measures administered for each skill area. The Gates-MacGinitie Vocabulary test and a treatment-specific vocabulary test were administered as measures of vocabulary skills. Verbal analogies skills were also measured by two tests, one treatment-specific and one nontreatment specific, measuring possible transfer effects. All measures (except the nontreatment-specific measure of verbal analogy skills) were administered on both a pretest and posttest basis.

RESULTS AND DISCUSSION

Positive TGT effects were noted for both measures of vocabulary skills (Gates-MacGinitie and treatment-specific). Significant ability-by-treatment interaction effects on vocabulary skills were found and appear due to strong gains by low-ability TGT students. The interaction effect supports the result obtained in Study 1, although the effect in the present study must be interpreted with caution. The smaller rate of growth for high ability TGT students may have been due to a "ceiling effect" created by the measures of vocabulary skills used.

A significant positive TGT effect was also obtained for the treatment specific verbal analogies test. A positive trend only was noted for the non-treatment specific verbal analogies test (measuring possible transfer effects). The lack of a significant TGT effect on the test of transfer appeared due to the test being too simple. Another way of examining these data is to look at the number of students in each group who achieved mastery of the test (defined as correctly answering 90% or more of the items). Fifty-two percent of the TGT students reached mastery on the test, whereas only 38% of the control students reached mastery. In short, the study provided positive support for the use of TGT in teaching reading skills to young children. Not only were basic skills positively affected (i.e., broadening of vocabulary), but more cognitively complex skills, such as verbal analogies, were also directly affected.

STUDY NUMBER 9

BACKGROUND INFORMATION

DeVries, David L., Lucasse, Phillip R., Shackman, L. "Small group versus individualized instruction: a field test." Center for Social Organization of Schools, The Johns Hopkins University, Baltimore, Maryland, Forthcoming.

RESEARCH QUESTIONS

Study 9 was a large field study comparing the effects of TGT with another innovative instructional program involving individually prescribed instruction. The comparison is of interest because they create such different instructional climates. Also included in the study was a comparison of two teacher training modes. One mode involved simply providing the teacher with the curriculum materials and a teacher's manual for the innovation instructional method. The other mode consisted of providing the curriculum materials, teacher's manuals, and a three-hour workshop followed up by regular visits to the teacher's classroom by a consultant. The latter question (that of training mode) became of interest to the TGT researchers as developmental and dissemination issues surrounding TGT became increasingly important.

METHODS

Approximately 1,700 seventh- and eighth-grade students were involved in a ten-week field experiment. The students represented 72 English classes, taught by 24 teachers (3 classes per teacher). The experiment employed a 2 x 2 factorial design, with an external control group. The two factors of the design were instructional method (TGT vs. Individualized

Instruction) and training mode (manual only vs. manual, workshop, and consulting). Teachers were randomly assigned to treatment groups, resulting in 5 teachers (15 classes) in every cell, except one in which there were 4 teachers. The ten-week experiment involved a basic language arts curriculum which focused on spelling, punctuation and syntax skills. Dependent variables measured were (1) achievement in language arts (Hoyum-Sanders Junior High School English Test and a treatment-specific test of language arts skills), (2) student self-concept (using two subscales--peers and general--from Coopersmith's scale), and (3) classroom process (using a variety of scales from the Learning Environment Inventory). Both pretest and posttest measures were obtained for all dependent variables. All analyses were conducted using classrooms as the unit of analysis.

RESULTS AND DISCUSSION

The preliminary analyses focused on the 2 x 2 design. The analyses indicate an instructional method treatment main effect for the treatment-specific language arts achievement test (with TGT classes showing greater growth), but not for the Hoyum-Sanders. A significant instructional method effect was also noted for the relationship-with-peers subscale from Coopersmith's Self-Concept scale, with TGT students scoring higher. No instructional method effects were detected for any of the classroom process variables. The training mode factor had no significant effects across the range of dependent variables. In brief, the results suggest a positive TGT effect (when contrasted with a form of individualized instruction) on achievement and self-concept.

STUDY NUMBER 10

BACKGROUND INFORMATION

Slavin, R. E. Classroom reward structure: Effects on academic performance and social growth. Unpublished dissertation, The Johns Hopkins University, 1975.

Slavin, R. E. Teams-Games-Tournament: A student team approach to teaching adolescents with special emotional and behavioral needs. Center for Social Organization of Schools, The Johns Hopkins University, Report No. 206, 1975.

Slavin, R. E. A student team approach to teaching adolescents with special needs. Paper presented at the Annual Convention of the American Psychological Association, Washington, D.C., September, 1976.

RESEARCH QUESTIONS

The final TGT study conducted under the auspices of the School Organization Program was designed to accomplish two goals. The first was an evaluation of TGT in a setting in which the social climate effects of TGT would be especially important, a school for adolescents with emotional and behavioral problems. The second was to evaluate a modification of TGT designed both to increase the cohesiveness of the teams by having teammates compete together as a team, and to increase the effectiveness of the team practice component of TGT by structuring tutoring dyads within each team.

METHOD

Seventy-five (75) junior-high-school-age students in four social studies classes in a public school for adolescents with emotional and

behavioral problems served as subjects. One class was assigned to control (individualized instruction); one was assigned to TGT; and two were assigned to TGT-M (TGT modified). The same pair of teachers taught all classes as a team. There were two modifications introduced in TGT-M. First, instead of competing as individuals and contributing points to their teams, team members competed as a "panel," in which the highest performer on one team would compete against the highest on another, the second highest against the second highest, and so on. Second, teammates were assigned to tutoring dyads for team practice sessions. Dependent measures included academic achievement, as measured by both standardized and treatment-specific U.S. Constitution and Civil War tests; several interpersonal perception and attitude questionnaire scales; classroom observation, focusing on task vs. non-task and individual vs. peer-directed behavior; and several sociometric questions. In addition, an analysis was made on the effects of the different treatments on the correlation between academic performance and sociometric status gains (a measure of peer nomative climate).

RESULTS AND DISCUSSION

The academic achievement, questionnaire and sociometric measures were analyzed by means of multivariate analyses of variance. Overall treatment effects were found only on the sociometric measures, the number of fellow students named as friends and desired workmates. These effects were due to TGT-control differences; no TGT-M vs. control differences were found. Also, TGT, but not TGT-M produced positive effects on the peer normative climate measure. Both TGT and TGT-M

exceeded control in frequency of peer tutoring and percent of time on task. Followup observations five months after the conclusion of the study showed both TGT and TGT-M students to be interacting on task more than former control students, even though all students had been distributed among several classes. No TGT and TGT-M effects were found for academic achievement. This result repeats the finding of no TGT academic achievement effects in social studies for Study 5. However, the effects on peer interaction both during and five months after the experiment and the effects on friendship choices indicate that TGT (but not TGT-M) may have considerable value in settings for adolescents with special emotional and behavioral needs.

TGT AND RACE RELATIONS

BACKGROUND INFORMATION

DeVries, D. L., and Slavin, R. E. Effects of team competition on race relations in the classroom: Further supportive evidence. Paper presented at the Annual Convention of the American Psychological Association, Chicago, Illinois, September, 1975.

RESEARCH QUESTIONS

This study involves a secondary analysis of sociometric data collected in studies number 1, 3, and 5. The question asked of these data was whether TGT increased cross-race nominations on various sociometric questions more than control. As described above, the three studies varied in terms of design, setting, subjects, and sociometric questions asked, but all involved a TGT-control comparison and some sociometric measures.

METHOD

The experimental designs and procedures used in the three studies are described under the outlines of studies 1, 3, and 5. The classes in Study 1 were 30% black; in Study 3, they were 51% black; and in Study 5, they were 10% black.

RESULTS AND DISCUSSION

The results in all three studies generally supported the expectation that TGT would produce more frequent cross-race sociometric choices than control. In Study 1, a significant TGT effect on percent of choices that are cross-race was found on the question "Who has helped you with your classwork?," while no effect was found for "Who are your friends in school?" In Study 3, a significant TGT effect was found for "Who are your best friends?," and marginally significant cross-race effects ($p < .10$) were found for "Who are your friends outside of school?" and "Who would you go to for help?" No effects were found for "friends in school" and "helped you." In Study 5, significant TGT effects were found for "friends outside of school" and "friends in school," and marginal effects were found for "Who would you go to for help?" No effect was found for "Who helped you?" The lack of positive effects on the question "Who has helped you with your classwork?" in Studies 3 and 5 was attributed to a ceiling effect in these classes in both the control and experimental classes on cross-racial helping.

These results, taken in combination with the cross-race and cross-sex sociometric choice findings reported in Study Number 2, indicate a consistent pattern of TGT effects on these important dimensions. They point to a potential application of TGT for a purpose unrelated to academic achievement, the improvement of race relations in integrated classrooms.

CHAPTER IV

REVIEW OF TGT EFFECTS ON STUDENTS

This chapter summarizes the results of the ten field experiments reviewed in Chapter III. The review is structured by the two major questions directing the research: (1) What are the effects of TGT on students, when contrasted with those obtained using traditional reward and task classroom structures? and (2) What are the effects of the various TGT structural components on students? By reviewing the data collected in response to those two questions the reader should be provided with answers regarding the power of the TGT effects, as well as some indication as to which causal model might explain TGT effects.

WHAT ARE THE EFFECTS OF TGT COMPARED WITH CONTROL?

As a major revision of the classroom structure, TGT was expected to have a wide range of effects on students. Consequently the measurement strategy employed for most studies involved sampling effects on student achievement, attitudes, and various dimensions of classroom process. In evaluating TGT it is important to address separately each group of dependent variables.

Academic Achievement

The results for academic achievement of all ten studies are cited in Table IV-I. The rows in the table represent the ten field studies

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Insert Table IV - I About Here

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reported in Chapter III. The columns represent the various dependent variables measured in the studies. Each row by column cell contains either a "+",

Table IV-I

Summary of TGT Effects on Students

Study	Subject Area	Student Outcomes: Academic Achievement: Treatment Specific	Student Outcomes: Academic Achievement: Standardized Measure	Student Outcomes: Student Attitude	Classroom Process: Peer Tutoring	Classroom Process: Peer Normative Climate
(1)	Math	+	+	--	--	--
(2)	Math	+	--	+	+	+
(3)	Math	+	--	+	+	0
	Social Studies	0	--	0	0	+
(4)	Math	--	+	+	--	+
(5)	Social Studies	+ ($p < .10$)	0	+	+	+
(6)	Language Arts	+	+	0	+	--
(7)	Language Arts	+	+	0	+	--
(8)	Reading-Vocabulary	+	+	--	--	--
	Verbal Analogies	+	--	--	--	--
(9)	Language Arts	+	0	0	--	0
(10)	Social Studies	0	0	0	+	+

which indicates a significantly positive TGT effect, a "0" indicating a nonsignificant TGT effect, or a "--" which indicates the dependent variable was not measured in the study. There were no significantly negative TGT effects in the studies.

The results for academic achievement listed in Table IV-I are divided into two categories: treatment-specific measures and standardized measures. For two of the studies (# 3 and 8) the achievement measures were doubled because fairly independent skill areas were taught and measured separately. Of the eleven different treatment-specific tests of TGT effects made across the ten experiments, eight were significant at the .05 level, one was significant at the .10 level, and two tests (studies # 3 and 10, both social studies) were nonsignificant. It should be noted that where multiple treatment-specific measures were administered, a "+" was registered if at least one of the tests indicated a significant effect.

In short, the treatment specific measures indicated a rather consistently positive TGT effect on academic achievement. The effects were often of surprising magnitude. For example, TGT accounted for 15%, 15%, and 11% of the variance in the dependent variable in studies number 7, 8, and 9, respectively. The studies in which no effect, or at most marginal effects were obtained share one common feature, namely subject area. All three studies involved social studies classrooms. It proved very difficult for the authors and the participating social studies teachers to delineate a set of measurable (and thus perhaps teachable) concepts on which the treatments could be focused. The lack of a consistent TGT effect on social studies achievement may be due to the difficulty of developing specific skill-based items for use in a TGT game.

TGT effects on standardized measures of academic achievement are also listed in Table IV-I. Of the eight separate tests using standardized measures, TGT had a positive effect on five, with three tests indicating no significant differences between TGT and control. The standardized tests were typically included in the measurement strategy as measures of a possible generalization of the specific skills taught during the targeted curriculum unit. To that extent they represent less sensitive measures of treatment effect, but more representative measures of the total set of skills required in a given subject area. The fact that five of the eight tests proved significant for TGT provides strong additional support for the effectiveness of TGT in assisting the teaching process for a variety of skill areas.

Student Attitudes

The effects of TGT versus control on student attitudes are also summarized in Table IV-I. Student attitudes were typically measured by both or one of the following measures: the Satisfaction scale (with activities in the classroom) taken from the Learning Environment Inventory, (Anderson, 1969) and an Attitudes toward the Class Scale designed by the author. The two scales were highly intercorrelated and tended to respond similarly to TGT (see studies number 2 and 5). The effects of TGT on student attitudes appear to be rather inconsistent. Of the nine times in which student attitude was measured, significantly positive TGT effects were noted for four of the studies, and no significant TGT effects were noted for the remaining five.

At first glance, these results are somewhat confusing in light of the widespread enthusiasm of TGT students, an enthusiasm apparent to both

participating teachers and researchers. One explanation for the less than overwhelming TGT effect is that the control group students were satisfied with what they were doing in the classroom. With such a high baseline condition, it would be most difficult to get a significant treatment effect. The responses of the control students in Studies # 6 and 7 to the question "Do you like coming to class?" are instructive. In response to this question, 64% of the control students in study #7 indicated "Yes," as did 96% of the control students in study #7. Such a high baseline may be due in part to the attempt by the TGT researchers to include new and interesting activities in many of the control conditions in order to control for a possible "Hawthorne Effect."

An interesting question to ask of the results in Table IV-I is whether the inconsistent TGT effect on attitudes is associated with a similar lack of treatment effect on achievement. Comparing the attitude column with the treatment specific achievement column reveals no obvious relationship. The four studies which found a positive TGT attitude effect also had positive achievement effects. Of the five studies for which no attitude effect was observed, three had a significant TGT effect on achievement. In short, the effects of TGT on achievement and attitudes appear to be relatively independent.

Classroom Process

Of the various classroom process measures taken in the ten studies, two stood out in terms of both the frequency with which they were measured and their importance for the theory behind TGT. These are frequency of student peer tutoring and the quality of the peer normative climate (designating

the degree to which students expect and reinforce successful task performance by their classmates). TGT, it has been postulated, should affect achievement precisely because it creates a structure which reinforces student peer tutoring and a peer normative climate directed towards academic achievement. Table IV-I reviews the results for both variables. The peer tutoring variable included both observational measures of student behaviors during unstructured practice sessions and sociometric data (in which students listed students who helped them or whom they had helped). The peer normative climate variable was measured either by peer pressure scales, classmate expectation scales, mutual concern scales, or the correlation between academic performance and sociometric status gains, all of which measure the degree to which students want their classmates to perform well on the academic tasks in the classroom.

As Table IV-I indicates, positive TGT effects were obtained for six of the seven times peer tutoring was measured. Of interest is the correlation across studies between increase in peer tutoring and increase in academic achievement. The one observation point (study #3 - social studies) in which no peer tutoring effect was obtained also recorded no gain on academic achievement. For five of the other six observation points, positive TGT effects on peer tutoring coincided with positive effects on academic achievement, the one exception being the study conducted with students with emotional difficulties. These results suggest that the increase in peer tutoring created by TGT may be an important mediating variable in any model of TGT's effectiveness.

It appears that increased student peer tutoring can be created merely by providing the opportunity through unstructured practice sessions and through creating a reward structure in which peer tutoring (within a team)

is reinforced. Whether the increase in peer tutoring is a response by the students to changes in the classroom reward structure is unclear. Other changes (e.g., in attitudes toward classwork and in perceived importance of success in the classroom) occurred simultaneously in the students and may have accounted for the observed effect.

Table IV-I also indicates consistently positive TGT effects on peer normative climate. For five of the seven studies in which the normative climate was measured, positive TGT effects were obtained; no significant difference was obtained for the remaining two. The relationship between TGT effects on peer normative climate and on academic achievement are not clear. Particularly significant is the lack of correlation between achievement gains and normative climate gains for the two studies in which no TGT effect on peer normative climate was observed. In short, although TGT created the predicted effects on peer normative climate, resulting in greater student concern for classmates' success on classroom tasks, it is unclear how important a role this variable plays in mediating treatment effects on academic achievement.

Cognitive Mediating Variables

An additional set of mediating variables measured in two of the studies conducted (#4 and 5) were derived from expectancy-value theory. As noted earlier, expectancy-value theory predicts that an individual's motivation to perform on a task is a function of (1) his perceived probability of success at the task, and (2) his incentive value of success at the task. In other words, a person is likely to work hard in the classroom to the extent that (1) he believes he has a reasonable chance at succeeding at the

task and (2) succeeding at the task is important to him. A problem with many traditional classrooms that has been noted by Kagan (1974) and McKeatchie (1974) is their inability to make a majority of students believe they have a reasonable chance of succeeding, much less make them value the success.

In studies 4 and 5, positive TGT effects were detected on student questionnaire measures of perceived probability of success and incentive value of success. In part, TGT increases actual probability of success for the majority of the students by the unique tournament structure in which any given student competes only with two other students of comparable achievement level. TGT also changes actual probability of success by giving students two performance measures to serve as criteria of success, individual and team scores. For example, a student on a given tournament day may be low scorer at his table, but his team may have won the tournament for that day. The low scoring student may opt to identify with the team score, or at least use both his individual score and his team score in evaluating his performance.

The incentive value of success also altered by TGT is a highly subjective concept likely to be affected by a variety of forces in the classroom. Expectancy-value theory indicates a student will value success in the classroom to the extent that such success is instrumental for obtaining other rewards for the student. One set of rewards of obvious importance to students is that of peer respect and praise. Slavin, et. al. (1975) and Slavin (1975) have shown directly that TGT creates a classroom in which success in the classroom results in increased peer respect. TGT

appears to enlist a new source or rewards--interpersonal in nature--and attaches them to successful performance in the classroom.

Other possible causes for the increased incentive value to succeed on the part of TGT students are increased visibility of performance and the social setting within which TGT students perform. An integral part of the TGT structure is the public feedback in which each student's score (as well as that of his team) is shared with all other classmates, creating highly visible performance. Success at such tasks is likely to be more highly valued than for tasks followed by feedback only to the individual student.

TGT also creates a task setting in which each student shares his success (or lack of success) with two other students at his tournament table. The social setting, which many students appear to find reinforcing, may lend greater significance to the performance on academic tasks, tasks to which many students attach little if any importance. In short, the TGT effect on incentive value of success is likely due to any one or any combination of a variety of structural changes created by TGT.

TGT versus Traditional: Summary of Effects

The ten studies conducted provide consistent evidence of the relative effectiveness of TGT when compared with traditional classroom reward and task structures. TGT creates greater growth in academic performance and in some cases improves student attitudes. These changes in student outcomes may be due to the following major changes in classroom process and individual student cognitions: an increased level of student peer tutoring; a peer normative climate which reinforces

academic achievement; an increase in perceived probability of success in the classroom, and greater importance or value attached by the students to success in the classroom.

WHAT TGT COMPONENTS ACCOUNT FOR THE TREATMENT EFFECTS?

The five studies which examined variations of TGT (#2, 3, 4, 5, and 10) addressed two distinct categories of variations. Numbers 2 and 4 assessed the relative impact of the team reward, game-tournament, and group practice components, while study 10 modified certain features of the game-tournament and group practice components. Numbers 3 and 5 focused on variations in the team reward structure, altering the formula by which scores of the various teammates were combined into a team total. The two categories will be reviewed separately.

TEAMS, GAME-TOURNAMENT, AND GROUP PRACTICE

The results of studies 2 and 4 indicate that both the student-team component and the game-tournament component have important, if somewhat distinct, effects on students. The impact of the group practice component appears minimal. First with regard to the effects of teams, the results of studies 2 and 4, both of which included teams as an experimental factor, are somewhat similar. Both studies indicated no team effect on attitude toward the task. Study 2 indicated a positive team effect on peer tutoring and on mutual concern. Study 4 indicated a positive team effect on peer normative climate. Study 4 also measured the expectancy-value constructs and found a positive team effect on incentive value of

success, but no such effect on perceived probability of success. Study 2 found no team effect on academic achievement, whereas study 4 revealed a positive team effect on achievement.

In short, the two studies indicate the team component creates different group processes by increasing the level of peer tutoring and altering the peer normative climate so students reinforce each other for success in the classroom. No team effects appear to exist on student attitudes. Teams may result in more academic achievement. The inconsistent results obtained for achievement should be viewed in light of the relatively short period of time for which study 2 (in which no team effect was found on achievement) was implemented. It is possible that had TGT been implemented for a longer period there would have been a positive TGT effect.

The effects of the game-tournament combination were examined in study 2. The results indicate a positive effect on (a) one of two treatment-specific achievement measures, (b) all of a variety of attitudinal measures, and (c) one measure of frequency of peer tutoring. The combination appears to be particularly important in altering the climate affect of the classroom. The games particularly are likely to result in a classroom perceived by the students as more enjoyable, a result noted also in a variety of experiments with simulation games in the classroom (Livingston et al, 1973). The positive effect on peer tutoring, although somewhat surprising, may be due to students actually helping each other during the game itself. The game does allow opportunities for peer tutoring, although at the same time it provides no obvious reason for interstudent helping, given

the competitive relationship among players.

The group practice session component was examined in study 4. The study suggests that group practice sessions may be effective in increasing achievement only for high achieving students. In fact, the group practice appeared to have a slightly debilitative affect on the performance of low achieving students. Precisely why the ability by group practice interaction effect was obtained is unclear. The result is comparable to that frequently obtained in peer tutoring studies--tutors appear to learn more than do the tutees. With regard to the other dependent variables measured, group practice had little effect on attitudinal or peer normative climate measures. Group practice did result in a lowered incentive value of success. In general, the results of Study 4 indicated that group practice contributes little to the overall TGT effect.

In Study 10, an attempt was made to increase the effectiveness of the group practice by giving it a formal structure. However, this modification did little to increase the effectiveness of TGT. In fact, the structured peer tutoring sessions were disliked by the students, and may have contributed to the relative ineffectiveness of this modification.

VARIATIONS OF TEAM SCORING

The reason for exploring variations in the procedure for forming team scores lies in part in the group contingencies research literature in which Hamblin and his associates experimentally altered such structures. Hamblin, et al. (1971) discovered important effects of altering team scoring procedures on both group process and on group academic achievement. Consequently, Studies 3 and 5 explored the effects of two highly divergent scoring procedures,

with study 3 weighting more heavily the performance of high achievers and study 5 assigning greater weight to the performance of low achievers. The results from both studies indicate that the variations have essentially no effect on achievement or on attitudes. Effects on classroom group process were also minimal. Only in investigating within-team processes (see study 5) were any effects noted, with teams in which the weighting of scores occurred focusing their peer tutoring more on the low achievers than did teams in which the unweighted scoring was used. This increased focusing was anticipated, but it apparently had little effect on the actual achievement of the low achieving teammates who were tutored.

In short, the results suggest that the 6-4-2 scoring procedure for all students used in TGT is probably as effective as one which weights more heavily the scores of either the high or low achieving teammates. It is possible that different results would have been obtained if the experimental comparison had not taken place in the context of the overall TGT treatment. The minor scoring changes were perhaps psychologically obscured for the students by the large number of other TGT components, all of which remained constant across the various treatment groups.

DOES TGT WORK BETTER IN SOME SITUATIONS THAN OTHERS?

In evaluating any new intervention it is important to assess its antecedent conditions; that is, when and for whom does the treatment work best? Some important dimensions on which TGT should be assessed are (1) student ability level, (2) student age, (3) student sex, (4) subject area, and (5) teacher characteristics.

Student Ability

In most of the studies student ability was included in the analysis of the data, with the analyses focusing on possible student-by-treatment interaction effects. Such interaction effects were observed on occasion. For example, Study 1 reported that TGT created greater achievement gains for low-ability classes than for average-ability classes. That pattern was indirectly replicated in study 8, in which the positive TGT effect on the development of vocabulary skills was due primarily to the low-achieving students. The interaction effect, it was hypothesized, was due in part to a ceiling effect. Only one other study (#2) reported an interaction effect, but in the opposite direction. That is, high-ability students primarily created the positive TGT effect on the treatment-specific measures of mathematics achievement.

In short, although each of the ten studies directly addressed the question of whether student ability acts to moderate the effect of TGT, only three studies resulted in such an interaction. Even within those three there is an inconsistency in the form the interaction took. TGT appears to facilitate the motivation and subsequent performance of students at all ability levels. This is true in spite of the fact that the TGT structure creates greater differences in probability of success for the low-ability students than for the average- or high-ability students.

Student Age

As indicated in Chapter III, TGT studies have been conducted with students ranging from the third to the twelfth grade. Do students within a certain age range appear to respond more positively

to TGT? Definitive answers are difficult to derive from the data, in part because studies which differed on the student age factor also differed on other dimensions (such as teacher, subject area, length of study). One could infer from the data available that students in the elementary grades are most responsive to TGT (in terms of growth in academic achievement), junior high students are next most responsive, and high school students are least responsive. However, only one study (#5) used high school students, and although only marginal achievement effects were obtained, very consistent and strong positive TGT effects were noted in both student attitudes and group process.

At this point the issue of specifying the age range within which TGT is effective remains an open question. Answers to the question will emerge as instructors from the entire range of grade levels (elementary through college) begin to use TGT in their classrooms. One remarkable feature of the available data is the obvious responsiveness to TGT of the third grade students in studies 6, 7, and 8. Although TGT requires the student to operate in social settings that vary dramatically in the cooperative vs. competitive reward structure, the students appeared not only to master such variety but to thrive on it. Although the attitude data from the studies do not suggest this, it was the impression of the authors that the third grade students proved most responsive to and motivated by the TGT experience.

Student Sex

As a technique which employs both interstudent competition and cooperation, one likely question concerns the possibility that either

males or females might respond more or less positively to TGT. Analyses of sex by TGT interactions were conducted for studies 1 through 3. The results were consistently nonsignificant, so the inclusion of such sex-by-treatment interaction terms was discontinued in subsequent studies. That is, TGT appeared to affect males and females comparably with regard to academic achievement, attitudes, and group process variables.

Such analyses contradict frequent teacher reports that TGT appears to particularly excite male students, resulting in greater change in achievement for males. These claims have not been supported by any formal analyses.

Subject Area

As with the analysis for student age, it is difficult to extract any definitive statements from the data regarding the issue of differential TGT effectiveness across subject areas. Only for the academic achievement variable is there any consistent trend in the data. As Table IV-I indicates, the TGT effects on achievement for the three studies involving social studies (#3,5, and 10) were minimal. This contrasts with the effects for mathematics, language arts, and reading, in which TGT effects on achievement were obtained most consistently.

There are several reasons why the TGT effects on social studies achievement were minimal. Perhaps the most important, as previously cited, lies in the difficulty of the authors and the participating teachers to zero in on a set of reasonably measurable curriculum objectives. The targeted objective in social studies typically suffered from being either highly specific (e.g., the student will be able to name the date

on which the American Revolution began) or global. Consequently the games developed around such objectives tended to suffer as instructional devices. To what extent such problems in forming a teachable core set of curriculum objectives is shared by other social studies teachers is not clear to the authors. What is clear is that no matter what the subject area, TGT can be effective in improving achievement to the extent that a curriculum area can be partitioned into a discrete set of measurable objectives, a set within which the objectives follow in some meaningful sequence.

Teacher Characteristics

That TGT has greater effects on achievement, attitudes, and process for some teachers than for others should come as no surprise. What is more important is assessing what teacher characteristics might be relevant. Two of the studies incorporated the teacher factor into the design such that teacher effect could be directly assessed (studies #5 and #9). In study 5, teacher-by-treatment interaction effects were noted consistently. Not only were significant interaction effects obtained across a variety of dependent variables, but the direction of the effects was also consistent. Why did the two teachers achieve such consistently different results with TGT? The answer appears to be more with the resources available to the teachers than with their personal characteristics. More specifically, the teacher with large classes (N=50) created much less of a TGT effect than did the teacher with class sizes of approximately 25.

In the second study which included teacher as a factor (#9), the teacher effect consistently accounted for a relatively large proportion of the dependent variable variance above and beyond that accounted for by treatment effects. Preliminary analyses of the TGT cells indicate that the treatment may have even maximized teacher effects. More specific conclusions regarding which types of teachers the treatment works best for await subsequent analyses.

In short, teachers are differentially effective when using TGT. The data from the formal studies suggest that resources available to the teacher are important in determining level of success. These resources may include classroom size as well as clerical assistance. It does not appear to be a technique which requires a charismatic teacher, or one who has considerable teaching experience. If any personal characteristic is essential it probably involves the willingness of the teacher to relinquish a portion of the control of the classroom and to tolerate the certain level of disruption which is inevitable whenever initiating a new classroom intervention.

CHAPTER V

IMPLICATIONS FOR EDUCATORS

TGT, as evaluated in the ten studies summarized in Chapter III, is a technique that can be directly transferred to classroom use, as it does not rely on extra personnel, major outlays of money, or extensive teacher training. Scores of teachers have taken the TGT manual, made their own games, and successfully used the technique without outside support. As a consequence, the research findings on TGT have direct implications for classroom practice. Some of these implications are:

1. TGT is an effective means of increasing academic performance

TGT is unusual among educational techniques in the extent to which its effects on academic achievement have been documented. A teacher who uses TGT in any subject can be confident that the academic achievement of students will not suffer--the students probably will learn more than they would have in a traditionally structured class.

2. TGT has other important effects on students

Also unusual among educational techniques is the number and variety of positive effects TGT has on non-academic outcomes. Of these, the most important is probably the effect on cross-racial helping and friendship. The continued segregation of students into black and white friendship groups has frequently been observed even in the most racially harmonious integrated secondary schools. In schools with racial frictions, this separation can be total. TGT gives black and white students opportunities to interact in a setting that is likely to engender liking and respect

among team members. TGT effects on race relations have been documented in four studies, none of which were specifically designed to study the issue. These results indicate that TGT can be justified for use in integrated settings solely for the purpose of increasing cross-racial intergation and liking.

Other important outcomes affected by TGT include students' liking of others and feelings of being liked, their mutual concern, cohesiveness, and feeling of class membership. These dimensions can be seen as components of positive mental health. The finding of positive TGT effects on these dimensions indicates that TGT may be used as a means of increasing the "social connectedness" of students in general. Whether this in turn could result in important and lasting impacts on student mental health is an interesting, and still open, question.

Further outcomes, such as effects on attitudes toward school, pro-academic peer norms, and perceived probability and incentive value of success, support the use of TGT primarily for its non-academic effects. For example, a teacher might be justified in using TGT because he or she has noticed that hard working academically interested students are shunned or ridiculed by their classmates, or that the class does not seem cohesive or mutually supportive, or that there is little inter-racial contact or friendship. TGT provides an opportunity for the teacher to address these problems while contributing to, rather than detracting from, the cognitive learning goals which are the primary ones in most schools.

3. TGT changes the role of the teacher from manager to curriculum expert and resource

The TGT technique brings about several changes in the authority structure of the classroom. The most important change is that of the teacher's role. In the traditional classroom, the teacher is manager, motivator, and evaluator as well as instructor. The TGT structure relieves the teacher of many of these often conflicting roles. The technique provides a classroom organization and a regular format for student work, motivation, and evaluation. This leaves the teacher with an undivided responsibility to provide information to students. Students soon learn that the teacher is a valuable resource for information needed to do well in the TGT competition.

Another important change in the classroom authority structure is a change in the student's role. The student is no longer simply receiving information, but is now made responsible for his or her own learning. Students have a clear-cut task to learn a certain body of information and then demonstrate that they have learned it. No excuses or playing on the teacher's sympathies will do. In addition, neatness, classroom behavior, and "class participation" are no longer involved in the motivation--evaluation process. Studying is the only way to do well.

4. TGT is adaptable

TGT complements, rather than replaces, other kinds of instruction. This means that TGT may be successfully applied in a variety of settings. For example, it is not important how information is first presented--the TGT technique provides practice and overlearning on any material however it was first learned. This means that TGT can be used in classrooms

using individualized instruction, open space, or any other structure with only minor modification. Because it does not require a new instructional mode, teachers need not be trained in a new way of teaching or in a new philosophy of education. Any teacher can successfully use the technique. TGT is not "teacher-proof," but it can give any teacher a great deal of aid in maintaining motivation and interest in subjects that could otherwide be difficult to get children to attend to.

TGT does not take the majority of class time. In most of the experiments reported, TGT activities took no more that 30% of classroom time. More importantly, TGT appears to work both when applied intensively (for example tournaments every other day) and intermittently (weekly tournaments).

The TGT structure itself can be modified to reflect major differences between students. One simple modification is the provision of especially difficult "bonus" questions for students at the top two or three tournament tables. If ability differences in a classroom are extreme, different games may be played at different tables.

5. TGT research represents a useful model of research on practical classroom interventions

Research in methodologies of education often takes one of two approaches. One is highly controlled experiments, either conducted in the laboratory, administered by an experimenter in a classroom, or occasionally administered by a teacher with experimenters directing teacher behavior. The second approach tests instructional methodologies in classroom settings using few (if any) experimental controls. In

this model of research, teacher effects, school effects, class effects, and the like are often completely confounded with treatment effects. Further, there is often so little control over the independent variables being manipulated that it is uncertain just what has been done. The well-controlled-experiment strategy is usually high in internal validity, but often meaningless in terms of application of tested procedures to real classrooms. On the other hand, the poorly controlled classroom research often leaves open multiple alternative explanations for study findings. In the worst of them (such as those in which teachers volunteer for experimental or control treatments) the conclusions drawn are worthless. However, these experiments can more directly inform classroom practice than can the controlled but laboratory-like experiments, as the treatments used in the studies are capable of being used in actual classrooms without outside assistance.

The research on TGT has been designed to steer a course between these two models. The evaluative studies of TGT have involved experimental controls, but they have all been interventions administered by teachers in normal classes without extensive outside help. That is, the teacher manuals used in the research can be (and have been) used by teachers entirely by themselves. The experimental controls used have included random assignment of students to treatments at the individual student level in six of the ten TGT studies, and at the teacher or class level in the other four. Teacher and teacher-by-treatment effects have been controlled in several studies by rotating teachers across classes or by statistical means. This research strategy insures a high degree of internal validity, as compared to most classroom studies of

instructional methodologies, without reductions in external validity. While the experimental controls are not always perfect, they are at least unbiased. This means that the consistency of findings across independent studies using procedures which may be flawed in minor but different ways in each study may be interpreted as ruling out alternative explanations of the findings.

The research strategy used to evaluate TGT is one that could be used much more frequently in classroom research on instructional methodologies. It is an inexpensive, practical means of adding to our knowledge of instructional method.

6. TGT has some limitations in usefulness.

TGT has shown its greatest effects in teaching subjects which have easily quantifiable behavioral objectives and which involve relatively simple, concrete skill areas. TGT can probably not be used to teach skills such as essay writing or story analysis. These subjects are neither "gameable' nor "tutorable." To be gameable a skill area must be capable of being broken down into relatively short-answer questions which have only one correct answer. To be "tutorable," the skill area must be one that children can teach each other. Finding the theme of a short story, evaluating art, or writing of any kind would be difficult to teach in a TGT framework (although they could be taught using a drastic modification of the technique).

7. TGT continues to be developed and disseminated.

At this writing, the development of curriculum materials suitable for use in a TGT format is underway. Approximately 200 games for grades K-9 will be developed in basic language arts and mathematics skill areas, and are due to be published by September, 1977, by Argus Communications, Inc. Expansion of TGT units into other subject areas will continue in following years. A smaller set of games and the TGT manual are already on the market.

Small-scale dissemination activities have been undertaken during the development of the TGT technique. This dissemination effort has involved conducting three-hour workshops for from fifteen to fifty persons. The TGT workshop typically involves a slide presentation, a simulation of TGT techniques, and discussion. If time is available, teachers are aided in developing a set of initial TGT games.

Dissemination of TGT has since vastly increased, due to the publication of the TGT manual and several game units. A mass mailing by the publisher of an informational brochure has informed hundreds of thousands of educators about TGT. Another important event has been the approval of TGT by the Joint Dissemination Review Panel of the Department of Health, Education, and Welfare. This action permits districts to apply to the U. S. Office of Education for funds to implement TGT. Further, the Detroit Public Schools are training 350 junior high school mathematics teachers in TGT as part of an ESAA project facilitating the desegragation process. Also, in-service courses on TGT have been developed and are being provided to various teacher groups. These events make it likely that the use of TGT will increase enormously over the next twelve months.

8. Research on techniques related to TGT continues.

While the evaluative research on TGT is complete, the Center for Social Organization of Schools continues to research techniques related to TGT. This research effort recognizes that TGT is but one effective variation of classroom task and reward structures. The research is currently (1) investigating the effectiveness of a student team technique that is much simpler than TGT in that it does not involve games; (2) examining the effects of student team techniques in general on race relations and student mental health; (3) investigating the factors of team size and teams composed of friends vs. strangers; and (4) evaluating the independent effects of same-age peer teaching and group reward on academic performance. This continuing research is expected to shed new light on the theory behind the effectiveness of student team techniques, and to develop new, possibly simpler student team techniques capable of accomplishing many of the same outcomes achieved by TGT.

In conclusion, TGT may be seen as representing an unusual event in the history of educational research. It is a technique which arose out of social psychological theory; was exhaustively evaluated in field settings using designs that were high in internal and external validity; and may find its way into educational practice on a mass-scale. The evidence collected in the course of research on TGT suggests that if this mass acceptance does occur, education at many levels and in many subject areas may become more effective in increasing the academic achievement, social growth, and mental health of children.

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APPENDIX A

GIGS RULE SHEET

GIGS: GENERAL INSTRUCTIONAL GAME STRUCTURE

I. TO START THE GAME, shuffle the cards and place them face down on the table. Play is clockwise.

II. TO PLAY, each player in turn takes the top card from the deck, reads it aloud, and does one of two things:

A. Says he does not know or is not sure of the answer and asks if another player wants to answer. If no one wants to answer, the card is placed on the bottom of the deck. If another player answers, he follows the procedure below.

B. Answers the question immediately and asks if anyone wants to challenge his answer. The player to his right has the first chance to challenge; if he does not wish to challenge, then the player to his right may challenge.

1. If there is no challenge, another player should check the answer.

a. If correct, the player keeps the card.

b. If incorrect, the player must place the card on the bottom of the deck.

2. If there is a challenge and the challenger decides not to answer, the answer is checked.

a. If the original answer is wrong, the player must place the card on the bottom of the deck.

b. If the original answer is correct, the player keeps the card and the challenger must give up one of the cards he has already won (if any) and place it on the bottom of the deck.

3. If there is a challenge and the challenger gives an answer, the answer is checked.

a. If the challenger is correct, he receives the card.

b. If the challenger is incorrect, and the original answer is correct, the challenger must give up one of the cards he has already won (if any) and place it on the bottom of the deck.

c. If both answers are incorrect, the card is placed on the bottom of the deck.

III. THE GAME ENDS when there are no more cards in the deck; the player who has the most cards is the winner.

APPENDIX B

SAMPLE TGT GAME

Verb Forms (Game K)

Worksheet

Name _____

Date _____

Class _____

No. Correct _____ Team _____

OBJECTIVE: Change verbs from present to past tense and identify verbs as regular or irregular.

INSTRUCTIONS: This worksheet will help you prepare for the Verb Forms Game (K). Each sentence contains a blank space and a verb to fill in the blank. Write the past tense of the verb, and write whether the verb is regular or irregular. Use the following rules to help you:

Regular verbs form their past tense by adding ed to the infinitive.

Example: talk-talked; work--worked

Some regular verbs have to be slightly changed before forming the past tense.

1. Drop the final e before adding ed.

   Example: Gripe--griped (not gripeed)

2. When the infinitive ends in y preceded by a consonant, change the y to i before adding ed.

   Example: cry-cried (not cryed)

3. When the infinitive ends in one consonant preceded by one vowel, double the consonant before adding d, if the word has only one syllable or if the last syllable is stressed.

   Example: (stop-stopped) --, but, happen--happened (First, not last syllable is stressed. Don't double the consonant!)

Irregular verbs do not form their past tense by adding ed to the infinitive. The only way to learn the past tense of an irregular verb is to memorize it andpractice it frequently until it becomes familiar.

My father (work) in a bank all his life.

_____

_____ K-1

The passengers were excited when the captain (sight) land.

_____

_____ K-7

After the tennis match, Susan (drink) a glass of lemonade.

_____

_____ K-13

The lake (freeze) last week.

_____

_____ K-2

When his mother wasn't looking Mark (snatch) a cookie from the jar.

_____

_____ K-8

The children (run) down the street trying to follow the fire truck.

_____

_____ K-14

The girl (sing) the song well.

_____

_____ K-3

With a spectacular leap, the outfielder (catch) the ball.

_____

_____ K-9

The sheriff (gun) the criminal down while riding on a horse.

_____

_____ K-15

After he (peel) the orange, he threw away the rind.

_____

_____ K-4

The school (send) the students' report cards to their parents.

_____

_____ K-10

Barbara's father (bring) his lunch with him to work last week.

_____

_____ K-16

The thief (steal) the money.

_____

_____ K-5

Jack's father (mend) the holes in his socks.

_____

_____ K-11

The stranger (ring) the doorbell, but no one answered.

_____

_____ K-17

Martha and her sister (fight) frequently when they were little.

_____

_____ K-6

The teacher (think) that the class enjoyed the film.

_____

_____ K-12

Bill (dig) the garden in April.

_____

_____ K-18

The dog (chase) after the cat and frightened it.

_____

_____ K-19

John found a good recipe and (bake) a chocolate cake.

_____

_____ K-25

John (pose) for the photographer but moved just as the picture was taken. _____

_____ K-31

The teenagers (enjoy) themselves on the beach but got sunburned.

_____

_____ K-20

The campers used backpacks and (carry) their equipment on their backs.

_____

_____ K-26

The boys (hide) behind the sofa.

_____

_____ K-32

My father (forgot) to bring his keys with him yesterday.

_____

_____ K-21

Jane (reach) as high as she could but still couldn't remove the book from the shelf.

_____

_____ K-27

The mechanic (loosen) the screw with a wrench.

_____

_____ K-33

The baby (speak) in nonsense words.

_____

_____ K-22

Mr. Wilson (teach) sixth grade for fifteen years.

_____

_____ K-28

Sandra's grandfather (die) five years ago.

_____

_____ K-34

The shower (leak) all week until the plumber fixed it.

_____

_____ K-23

Jane (choose) a cola to drink.

_____

_____ K-29

Bill (hear) the alarm clock ring but still didn't get out of bed.

_____

_____ K-35

The children sat in the sandbox and (make) castles.

_____

_____ K-24

Hansel and Gretel (lose) their way in the woods.

_____

_____ K-30

Who (put) the book on the wrong shelf yesterday?

_____

_____ K-36

Mr. Roberts (sell) the car but lost money on the deal. _____ _____ K-37		
Jack (hold) his baby sister in his arms and fed her. _____ _____ K-38		
Susie had a fever and (stay) in bed all day. _____ _____ K-39		
St. George (slay) the dragon. _____ _____ K-40		

ANSWER SHEET

Item	Past Tense	Regular Irregular	Item	Past Tense	Regular Irregular
K-1	worked	regular	K-21	forgot	irregular
K-2	froze	irregular	K-22	spoke	irregular
K-3	sang	irregular	K-23	leaked	irregular
K-4	peeled	regular	K-24	made	irregular
K-5	stole	irregular	K-25	baked	regular
K-6	fought	irregular	K-26	carried	regular
K-7	sighted	regular	K-27	reached	regular
K-8	snatched	regular	K-28	taught	irregular
K-9	caught	irregular	K-29	chose	irregular
K-10	sent	irregular	K-30	lost	irregular
K-11	mended	regular	K-31	posed	regular
K-12	thought	irregular	K-32	hid	irregular
K-13	drank	irregular	K-33	loosened	regular
K-14	ran	irregular	K-34	died	regular
K-15	gunned	regular	K-35	heard	irregular
K-16	brought	irregular	K-36	put	irregular
K-17	rang	irregular	K-37	sold	irregular
K-18	dug	irregular	K-38	held	irregular
K-19	chased	regular	K-39	stayed	regular
K-20	enjoyed	regular	K-40	slew	irregular

APPENDIX C

SAMPLE TGT NEWSLETTER

Sample Newsletter

THE WEEKLY PLANET-4TH PRIOD

Vol. 4 Mrs. Wills, Editor March 28

FLASH! Fantastic Four Sweep Language Arts Tournament!

The Fantastic Four was the winning team this week, with a total of 22 points. John T., Kris, and Alvin put in outstanding performances for the Four, each contributing six points to their team. Their victory brings the FF to second place in the National League standings, only six points from first!

Hot on the heels of the Fantastic Four were the Brain Busters, with 21 points. Anita and Tanya helped the team out with victories at their tables, while Peter tied for first at his. The Brain Busters are still third in the National League competition, but moving up fast!

In third place this week were the American League Geniuses, with 19 points. They were helped out by Kevin and Lisa A., both table winners. Other table winners were Lisa P., of the Daredevils; Mike, of the Grammar Haters; and Sharon, of the Redskins.

The Scores

First Place - Fantastic Four

John T.	6
Mary	4
Kris	6
Alvin	6
	22

Second Place - Brain Busters

Anita	6
Peter	5
Darryl	4
Tanya	6
	21

Third Place - Geniuses

Mark	4
Kevin	6
Lisa A.	6
John F.	4
Dewanda	4
	24/19

Redskins

Robert	4
Eric	2
Sharon	6
Sylvia	4
	16

Daredevils

Lisa P.	6
Henry	2
Cindi	4
Frederick	4
	16

Chipmunks

Caroline	5
Jerry	2
Charlene	3
James	2
	12

Grammar Haters

Sarah	2
Willy	2
Mike	6
Theresa	3
John H.	2
	15/12

Season Standings

National League

Team	Season Score
Redskins	78
Fantastic Four	72
Brain Busters	66
Chipmunks	59

American League

Team	Season Score
Grammar Haters	74
Geniuses	65
Daredevils	57